

## Faculty of Life Sciences

### Programme Specification

**Programme title: MSc Drug Toxicology and Safety Pharmacology**

Academic Year:	2019-20
Degree Awarding Body:	University of Bradford
Partner(s), delivery organisation or support provider (if appropriate):	N/A
Final and interim award(s):	[Framework for Higher Education Qualifications (FHEQ) level 7] MSc Postgraduate Diploma Postgraduate Certificate
Programme accredited by (if appropriate):	N/A
Programme duration:	1 year full time
QAA Subject benchmark statement(s):	N/A
Date last confirmed and/or minor modification approved by Faculty Board	April 2019

**Please note:** This programme specification has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but changes may occur given the interval between publishing and commencement of teaching. Any change which impacts the terms and conditions of an applicant's offer will be communicated to them. Upon commencement of the programme, students will receive further detail about their course and any minor changes will be discussed and/or communicated at this point.

### Introduction

In order for any new therapeutic agent to progress to the market, or before any chemical can be used in living organisms including humans, a thorough identification and understanding of its toxicity and safety is required. Accordingly, drug toxicology and safety pharmacology is a central and integral component of the chemical and pharmaceutical industries. The discipline of safety pharmacology and toxicological evaluation is dynamic, expanding and multidisciplinary, adapting in response to the demands for new medicines and the improvement in assessment methodology. In both the laboratory and the pharmaceutical industry, safety pharmacology has had to adapt to the changing face of drug development by

establishing experimental models and target orientated assessment approaches. This is an exciting time to be involved in this area and, against a backdrop of increasing competitiveness in the chemical and pharmaceutical sector, the demand for “pre-trained” employees in this field is extremely high.

The MSc programme in Drug Toxicology and Safety Pharmacology is hosted by the Institute of Cancer Therapeutics which is situated in the heart of the University campus in purpose-built facilities. The Institute has a strong research ethos and it is particularly well known as a centre of excellence in drug development and pharmacology. It is a multidisciplinary organisation incorporating a broad spectrum of skills ranging from chemistry through laboratory drug evaluation to preclinical *in vivo* studies. The MSc Drug Toxicology and Safety Pharmacology programme leader (Dr V Vinader) has long-established experience in the pharmaceutical research and development environment, both in industry and academia. Therefore, this programme is designed to meet the demand of employers and provide a comprehensive overview of the Drug Toxicology and Safety Pharmacology process.

The programme provides state of the art training, both theoretical and practical, in the area of preclinical toxicology with an emphasis on the molecular and *in vivo* aspects of toxicological assessment. This programme is designed to attract individuals with a first degree in the biology, chemistry, medical, pharmaceutical, pharmacological or toxicological sciences who want to specialise in medicines development or undertake employment in the pharmaceutical industry.

For career progression within this sector, a postgraduate qualification is often required. The programme promotes advanced scholarship within specialised areas concomitant with the development of key transferable skills (in IT and bioinformatics) and research techniques. The programme uses a range of teaching strategies to promote independent study and research to develop a systematic and critical understanding of drug toxicology and safety pharmacology, and enhance students’ autonomous learning and personal transferable skills. This programme facilitates the development of the skills required for careers in academia, industry or for further research. Enhancement of independent learning skills during the programme will equip the students with the skills to succeed as lifelong learners.

### **Programme Aims**

The programme is intended to:

- A1 Enable students to develop a systematic understanding and critical awareness of, and skills in, selected disciplines within the field of toxicology and safety pharmacology.
- A2 Provide students with practical and hands-on skills applicable to the Drug Toxicology and Safety Pharmacology subject area.
- A3 Develop within the context of Drug Toxicology and Safety Pharmacology, a comprehensive understanding of communication, research and scientific method.
- A4 Provide students with a detailed knowledge of pre-clinical experimental approaches and legislative regulations.
- A5 Provide learning opportunities to enable students to think critically and to further develop as an autonomous and lifelong learner.

- A6 Further develop students' ability in a range of personal and key skills.
- A7 Provide a supportive educational environment, which meets the needs of students from a variety of backgrounds.

### **Programme Learning Outcomes**

To be eligible for the award of Postgraduate Certificate at FHEQ level 7, students will be able to:

- LO1 Critically evaluate specialised areas of toxicology and safety pharmacology.
- LO2 Critically evaluate scientific literature, discuss and communicate scientific data.
- LO3 Write and interpret scientific reports.
- LO4 Critically evaluate and appraise experimental laboratory techniques including obtaining a Home Office personal license for animal studies.
- LO5 Demonstrate critical thinking through ability to independently recognise, define and prioritise problems.
- LO6 Apply scientific principles to the critical analysis of problems in order to determine the safety profile of agents under evaluation.
- LO7 Develop autonomy in learning required for continuing professional development; apply skills in; time-management, presentation, written communication and problem-solving.
- LO8 Demonstrate critical thinking through the ability to independently analyse, interpret, objectively evaluate and prioritise information and data, recognising its limitations.
- LO9 Effectively communicate their understanding of research to different audiences through oral presentation.
- LO 10 Use software packages in the analysis and reporting of screening and safety profiling of drugs.
- LO11 Develop practical *in vitro* skills applicable to the drug toxicology and safety pharmacology discipline.

Additionally, to be eligible for the award of Postgraduate Diploma at FHEQ level 7, students will be able to:

- LO12 Understand molecular mechanisms of toxicity and apply that knowledge for the critical analysis of toxicity problems in order to determine the safety profile of agents under evaluation.
- LO13 Critically evaluate pre-clinical screening strategies *in vitro* and *in vivo* and develop a preclinical screening cascade.

Additionally, to be eligible for the award of Degree of Master at FHEQ level 7, students will be able to:

- LO14 Demonstrate a conceptual understanding of research and scientific method through the ability to independently critically evaluate methodology, and formulate conclusions based on complete and incomplete data.
- LO15 Demonstrate self-direction and originality in implementing a research project.
- LO16 Safely plan, design and execute practical investigations, from the problem recognition stage through to the evaluation and critical appraisal of results and findings.
- LO17 Make decisions in complex and unpredictable situations and use problem solving strategies to develop innovative solutions.
- LO18 Exercise initiative and personal responsibility.
- LO19 Communicate and interact with a variety of professionals from other disciplines.

## Curriculum

### Postgraduate Certificate/Postgraduate Diploma

FHEQ Level	Module Title	Type (Core/Option/Elective)	Credits	Semester	Module Code
7	Toxicology and Safety Pharmacology	Core	20	1	INC7005-B
7	Practical Skills in Research	Core	20	1	LIS7018-B
7	Critical Appraisal	Core	20	1	LIS7022-B
7	Preclinical Models for Drug Evaluation	Core	20	2	INC7001-B
7	Molecular Mechanisms of Toxicity	Core	20	2	INC7009-B
7	Case Studies in Drug Discovery	Option	20	2	INC7011-B
7	Innovation in Life Science Industry: From Concept to Market Place	Option	20	2	BIS7011-B

### Postgraduate Certificate

Students will be eligible to exit with the award of Postgraduate Certificate if they have successfully completed 60 credits and achieved the award learning outcomes.

### Postgraduate Diploma

Students will be eligible to exit with the award of Postgraduate Diploma if they have successfully completed at least 120 credits and achieved the award learning outcomes.

### Degree of Master

In addition to the modules outlined above for Postgraduate Certificate and Postgraduate Diploma

FHEQ Level	Module Title	Type Core/option/elective	Credits	Semester	Module Code
7	Cancer Therapeutics Research Project	Core	60	3	INC7019-E

Students will be eligible for the award of Degree of Master if they have successfully completed at least 180 credits and achieved the award learning outcomes.

### Learning and Teaching Strategy

A variety of teaching methods appropriate to the learning outcomes of the individual modules are employed throughout the programme and are supported by the virtual learning environment provided by the University. Students will experience lectures from ICT research/teaching staff and visiting clinicians and industrial researchers, small group workshops, one-to-one tutorials and practical classes. Students will also attend the Institute of Cancer Therapeutics Research Seminar programme. Self-directed independent learning forms a significant component at MSc level. Students will be supported to develop the attributes and skills needed for life-long learning and continued professional development. Directed private study includes variety of activities, reading of selected textbooks and specified source literature, use of the virtual learning environment, report writing, preparing presentations etc. The teaching methods focus on student-centred approaches to learning.

Some learning outcomes (LO) are focused on particular modules. For example, LO4 in *Practical Skills for Research*; LO6 in *Toxicology and Safety Pharmacology*, LO12 in *Molecular Mechanisms of Toxicity* and LO13 in *Preclinical Models for Drug Evaluation*. Acquisition of other learning outcomes will occur gradually and cumulatively through a number of modules employing a mix of lectures, laboratory investigations, coursework, workshops, individual project work and independent research guided by module tutors. Specialist knowledge in the field LO1 is introduced in *Toxicology and safety Pharmacology* module in semester 1, extended in *Molecular Mechanisms of Toxicity* module in semester 2, and further embedded in the Research Project. Key skills for working as a research professional are embedded in the curriculum and some modules develop or consolidate and assess one or more of the key skills. The MSc Research Project will allow students to demonstrate the skills and knowledge developed through the year, and its completion is essential to demonstrate mastery of LO14-19.

The University of Bradford is well known for attracting students from a wide variety of backgrounds, experiences and countries. This, and the learning facilities available to all students, provides the conditions for students to develop and manage their learning. The University of Bradford mission statement, Making

Knowledge Work, is embedded in the philosophy of this programme, and is supported by well-equipped practical and computational facilities. The methods of assessment of transferable skills are built into the structure of the examinations, case studies, and research or project work.

### **Assessment Strategy**

A range of assessment methods are used, supported by formative (unweighted) or low stakes assessments to allow students to practise skills and knowledge before final summative assessment at the end of a module or course. Written examinations are used to test LO1, LO4 (Home Office examination), LO6 and LO12. A range of types of coursework are also used to assess these, and other learning outcomes; essays of varying length, journal club presentations, training needs analysis, preparation of portfolios of reports on experimental work and reflective statements, assessment of students laboratory and transferable skills and professionalism during the project period, optionally poster presentation. The final MSc project is assessed by dissertation, viva voce examination and on students' approach to conducting research, and allows students to demonstrate their achievement of all learning outcomes developed as part of the PGC/PGD taught programme, and more specifically, achievement of LO14-19 required for the MSc degree.

Assessments have been arranged through the course to ensure students have a balanced load in each semester.

More detailed description of the way that learning is related to assessment in the modules that make up this programme can be found in the module descriptors

### **Assessment Regulations**

This Programme conforms to the standard University Regulations which are available at the following link:

<http://www.bradford.ac.uk/agpo/ordinances-and-regulations/>

### **Admission Requirements**

The University welcomes applications from all potential students and most important in the decision to offer a place is our assessment of a candidate's potential to benefit from their studies and of their ability to succeed on this particular programme. Consideration of applications will be based on a combination of formal academic qualifications and other relevant experience.

The standard entry requirements for the programme are as follows:

An Honours degree in a related scientific discipline or equivalent, at 2.2 classification or above. Applicants whose first language is not English will need to demonstrate proficiency in English in accordance with University Regulations. For further details, see:

<http://www.bradford.ac.uk/international/before-you-apply/english-language-requirements/>

Applications are welcome from students with non-standard qualifications or with significant relevant experience.

### **Recognition of Prior Learning**

If applicants have prior certificated learning or professional experience which may be equivalent to parts of this programme, the University has procedures to evaluate and recognise this learning in order to provide applicants with exemptions from specified modules or parts of the programme.

### Minor Modification Schedule

<b>Version Number</b>	<b>Brief description of Modification</b>	<b>Date of Approval (Faculty Board)</b>
2	Updates to align sem 1 curriculum with MRes to enable student transfer	April 2019